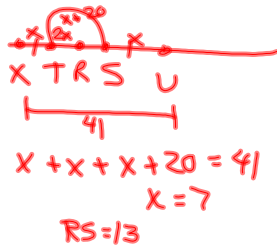
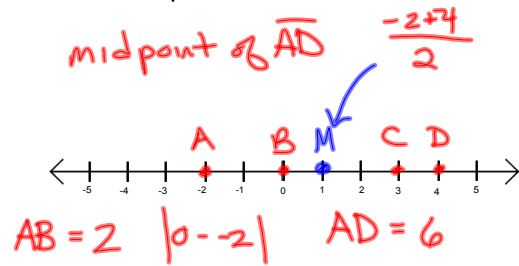


Warm-up

S is between T and U. R is between S and T. T is between R and X. $XT = SU$. TR is twice the length of SU. TS is 20 units longer than XT. Find RS if $XU = 41$.



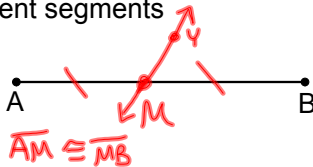
1.3 Use Midpoint and Distance Formulas



Find midpoint-average coordinates
Find distance-subtract coordinates

Midpoint of a Segment

Midpoint—point that divides a segment into two congruent segments



Segment Bisector—a point, ray, segment, line, or plane that intersects a segment at its midpoint

\overleftrightarrow{MY} bisects \overline{AB}

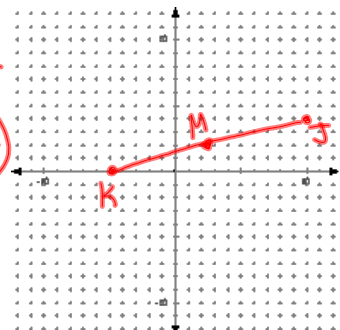
Find the midpoint.
 $J(10, 4)$ $K(-5, 0)$

Average of coord.

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$\frac{10 + -5}{2}, \frac{4 + 0}{2}$$

$$M\left(\frac{5}{2}, 2\right)$$



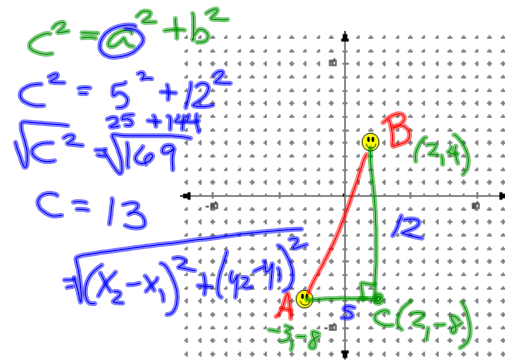
Do Find the midpoint

1. (4, -6) (-3, 2)
2. (-4, -3) (8, 5)

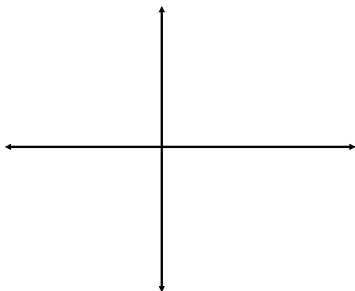
1. $(.5, -2)$

2. $(2, 1)$

Find the distance between A(-3,-8) and B(2,4).



In General:



The distance formula

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Find MN and OP

Do

1. M(-5, -2) N(1, 4)
2. O(-1, -1) P(20, 6)

$$MN = \sqrt{72} = 6\sqrt{2}$$

$$OP = \sqrt{490} = 7\sqrt{10}$$



M is the midpoint of \overline{UD}

U(5,2) M(3, -1) D(?)

$$\frac{5+x}{2} = 3$$

$$5+x = 6$$

$$x = 1$$

D(1, -4)

$$\frac{2+y}{2} = -1$$

$$2+y = -2$$

$$y = -4$$

M is the midpoint of \overline{UD}

U(-1,2) M(-6, 8) D(?)

Do

1. U(-5, -3) M(-6, 4) Find D

2. M(-3, 3) D(-14, 12) Find U